U.S. Serial No. 09/877,625
Reply to Office Action of: 06/19/03
Family Number: P1999J009-US2

REMARKS

Claims 1-10, 12-25, as amended, are submitted for examination. Reconsideration is respectfully requested.

The claims have been amended to make clear that the present invention uses all the wavelengths in step (c) that were used in the absorbance step (b). Matsushita does not do this. He uses only the wavelengths about 3300 cm^{-1}.

Claims 1-12 and 17-23 stand rejected under 35 USC 103(a) as being unpatentable over Matsushita, U.S. 5,420,041, in view of Ramamoorthy, U.S. 5,681,749. Claims 12-16, 24, and 25 have been objected to and would be allowable as rewritten in independent form.

The cited prior art does make the present invention unpatentable as discussed below.

Ramamoorthy determines the concentration of a mineral (inorganic) acid. Matsushita determines the concentration of organic acid, but only using a certain narrow wavelength range. The present invention determines the concentration of organic acid in specific ranges which does not include the range disclosed in Matsushita. Most important is that Matsushita teaches away from the present invention. Both references are discussed in more detail below.

I. Ramamoorthy, U.S. 5,681,749.

Ramamoorthy determines the concentration of a mineral acid (an inorganic acid). In column 7, lines 24-30, Ramamoorthy states:

SUMMARY OF THE INVENTION

The present invention resides in the use of near-infrared (NIR) spectroscopy for determining the concentration of mineral acid in a mixture comprising mineral acid, water and acid-soluble hydrocarbons.

In his two independent method claims 1 and 7, Ramamoorthy claims:

1. In a method for determining the concentration of mineral acid, water and acid-soluble hydrocarbons in a mixture containing unknown quantities of said mineral acid, said water, and said acid-soluble hydrocarbons,....

7. A method of determining the concentration of mineral acid, water and acid-soluble hydrocarbons which consist essentially of: ....

A mineral acid is an inorganic acid. Grant & Hackh's Chemical Dictionary define a mineral acid as an inorganic acid. See Grant & Hackh's, Chemical Dictionary, Fifth edition, 1987 at page 372 (copy attached).

II. Matsushita et al., U.S. 5,681,749

Matsushita's instrument measures many wavelengths, but he excludes them except around 3300 cm^{-1}. The patent explains why other wavelengths will not work. (see appendix below)

All the teaching of the reference must be considered. See MPEP 2123. Matsushita teaches away from the present invention by alleging that wavelengths other than about 3300 cm^{-1} will not work. The CAFC stated in In re Gurley, 27F.3d 551, 553, 31 USPQ2d 1130, 1131:

> A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. The degree of teaching away will, of course, depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant.

What is the effect of the prior art teaching away from the invention claimed in the present case? The CAFC has often cited that such a teaching negates obvious. In W. L. Gore v. Garlock, 220 USPQ 304, 312, the CAFC, referring to the patentee, said

> He proceeded contrary to the accepted wisdom of the prior art by dramatically increasing the rate and length of stretch *and* retaining crystallinity. That fact is strong evidence of non-obviousness. United States v. Adams, 383 U.S. 39 (1966).

In the present case, Matsushita said wavelengths not near 3300 cm^{-1} will not work to determine organic acid content.

Applicants believe that the claims now present in this application to be patentable and that this application is in condition for allowance, and such favorable action is respectfully requested. If any questions or issues remain, the resolution of which the Examiner feels would be advanced by a conference, he is invited to contact applicants' attorney at the telephone number noted below.

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Respectfully submitted,

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☐ Pursuant to 37 CFR 1.34(a)

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8/19/03

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APPENDIX

The Spectral Wave Number Ranges

The present invention uses the wave number ranges 1000-1350 cm^{-1}, 1550-2200 cm^{-1}, 24002770 cm^{-1} and 3420-4800 cm^{-1}.

Matsushita uses only the wave number around 3300 cm^{-1}. At column 2, lines 32-36 of the patent; Matsushita states:

> With commercially available soybean oil to which was added various amount of a fatty acid of known acid values as samples, absorbance at wave number of 4000-2250 cm-1 was measured by an infrared spectrometer. Then from absorbances at wave numbers of 3300 cm-1, 3400 cm-1 and 3120 cm-1 (Examples) and absorbance at 2530 cm-1 (Comparative Example), calibration curves were obtained. Then using them, respective acid values were determined.

At column 6, lines 42-46, of the patent, Matsushita states:

COMPARATIVE EXAMPLE

> Signal strength was read at a measurement wave number of 2530 cm^{-1} and at a wave number of 3800 cm^{-1} where no absorption occurs and from these data,....

Matsushita also explains why 1710 cm^{-1} will not work. The absorption is too large (1710 cm^{-1} is in the wave number range of the present invention). At column 1, lines 26-34, of the patent, Matsushita states:

> It is generally well-known that an infrared characteristic absorption band of organic acids i.e. —COOH group exists at wave numbers around 1710 cm^{-1}. Absorptivity of —COOH

> group in this absorption band is very large. Therefore, for measurement of its absorbance, thickness of sample layer must be much, much reduced, so it is necessary to prepare a thin film or a cell with a length of about several μm—several tens μm using the liquid filming method or the like.

At column 2, lines 3-11, of the patent, Matsushita explains why 2530 cm^{-1} will not work (2530 cm^{-1} is included in the present invention):

> Absorptivities at wave numbers around 2530 cm-1, depending on —COOH group, are extremely small. It is, therefore, possible to utilize relatively thick cells. There exist, however, a very large absorption of CH groups in its proximate region, so that the absorption peak, due to —COOH group, tends to be masked by the CH group's peak. For this reason, high precision measurement can hardly be made even using a high precision infrared spectrometer.